Claims

1. Plane-parallel structures of silicon/silicon oxide, obtainable by heating plane-parallel structures of SiO_y in an oxygen-free atmosphere at a temperature above 400 °C, wherein $0.70 \leq y \leq 1.8$, or plane-parallel structures of silicon/silicon oxide, obtainable by heating plane-parallel structures of SiO_x in an oxygen-free atmosphere at a temperature above 400 °C, wherein $0.03 \leq x \leq 0.95$, especially $0.05 \leq x \leq 0.50$, very especially $0.10 \leq x \leq 0.30$.

2. A plane-parallel pigment, comprising a silicon/silicon oxide layer, obtainable by heating a SiO_y layer in an oxygen-free atmosphere at a temperature above 400 °C, wherein $0.70 \leq y \leq 1.8$, or a plane-parallel pigment, comprising a silicon/silicon oxide layer, obtainable by heating plane-parallel structures of SiO_x, wherein $0.03 \leq x \leq 0.95$, especially $0.05 \leq x \leq 0.50$, very especially $0.10 \leq x \leq 0.30$.

3. A pigment according to claim 2, wherein the silicon/silicon oxide layer; obtainable by heating a SiO_y layer in an oxygen-free atmosphere at a temperature above 400 °C, forms the core of the pigment; wherein $0.70 \leq y \leq 1.8$.

4. A pigment according to claim 3, comprising a further layer of a dielectric material having a "high" refractive index.

5. A pigment according to claim 4, wherein the dielectric material is selected from silicon carbide (SiC), zinc sulfide (ZnS), zinc oxide (ZnO), zirconium oxide (ZrO_2), titanium dioxide (TiO_2), carbon, indium oxide (In_2O_3), indium tin oxide (ITO), tantalum pentoxide (Ta_2O_5), cerium oxide (CeO_2), yttrium oxide (Y_2O_3), europium oxide (Eu_2O_3), iron oxides such as iron(II)/iron(III) oxide (Fe_3O_4) and iron(III) oxide (Fe_2O_3), hafnium nitride (HfN), hafnium carbide (HfC), hafnium oxide (HfO_2), lanthanum oxide (La_2O_3), magnesium oxide (MgO), neodymium oxide (Nd_2O_3), praseodymium oxide (Pr_6O_{11}), samarium oxide (Sm_2O_3), antimony trioxide (Sb_2O_3), silicon monoxides (SiO), selenium trioxide (Se_2O_3), tin oxide (SnO_2), tungsten trioxide (WO_3) and combinations thereof, especially TiO_2, ZrO_2, Fe_2O_3, Fe_3O_4, Cr_2O_3, ZnO, or a mixture of those oxides, or an iron titanate, an iron oxide hydrate, a titanium suboxide or a mixture or mixed phase of those compounds.

6. A pigment according to claim 2 comprising in this order:

(a) a silicon/silicon oxide layer obtainable by heating a SiO_y layer in an oxygen-free atmosphere at a temperature above 400 °C,
(b) a reflective layer, especially a metal layer, and
(c) a silicon/silicon oxide layer obtainable by heating a SiO_y layer in an oxygen-free atmosphere at a temperature above 400 °C, wherein $0.70 \leq y \leq 1.8$.

7. A pigment according to claim 2, wherein the pigment comprises in this order:
(a2) a silicon/silicon oxide layer obtainable by heating a $SiO_{0.70-0.99}$ layer in an oxygen-free atmosphere at a temperature above 400 °C,
(b2) a silicon/silicon oxide layer obtainable by heating a $SiO_{1.00-1.80}$ layer in an oxygen-free atmosphere at a temperature above 400 °C, and
(c2) a silicon/silicon oxide layer obtainable by heating a $SiO_{0.70-0.99}$ layer in an oxygen-free atmosphere at a temperature above 400 °C, or
the pigment comprises in this order:
(a3) a silicon/silicon oxide layer obtainable by heating a $SiO_{1.00-1.80}$ layer in an oxygen-free atmosphere at a temperature above 400 °C,
(b3) a silicon/silicon oxide layer obtainable by heating a $SiO_{0.70-0.99}$ layer in an oxygen-free atmosphere at a temperature above 400 °C, and
(c3) a silicon/silicon oxide layer obtainable by heating a $SiO_{1.00-1.80}$ layer in an oxygen-free atmosphere at a temperature above 400 °C.

8. A pigment according to claim 2, wherein the pigment comprises in this order:
(a4) a silicon/silicon oxide layer obtainable by heating a $SiO_{0.03-0.69}$ layer in an oxygen-free atmosphere at a temperature above 400 °C,
(b4) a silicon/silicon oxide layer obtainable by heating a $SiO_{1.00-1.8}$ layer in an oxygen-free atmosphere at a temperature above 400 °C, and
(c4) a silicon/silicon oxide layer obtainable by heating a $SiO_{0.03-0.69}$ layer in an oxygen-free atmosphere at a temperature above 400 °C and optionally further layers, or
the pigment comprises in this order:
(a5) a silicon/silicon oxide layer obtainable by heating a $SiO_{0.03-0.69}$ layer in an oxygen-free atmosphere at a temperature above 400 °C,
(b5) a silicon/silicon oxide layer obtainable by heating a $SiO_{0.70-0.99}$ layer in an oxygen-free atmosphere at a temperature above 400 °C, and
(c5) a silicon/silicon oxide layer obtainable by heating a $SiO_{0.03-0.69}$ layer in an oxygen-free atmosphere at a temperature above 400 °C and optionally further layers, or
the pigment comprises in this order:

(a6) a silicon/silicon oxide layer obtainable by heating a $SiO_{0.70-0.99}$ layer in an oxygen-free atmosphere at a temperature above 400 °C,

(b6) a silicon/silicon oxide layer obtainable by heating a $SiO_{0.03-0.69}$ layer in an oxygen-free atmosphere at a temperature above 400 °C, and

(c6) a silicon/silicon oxide layer obtainable by heating a $SiO_{0.70-0.99}$ layer in an oxygen-free atmosphere at a temperature above 400 °C and optionally further layers, or

the pigment comprises in this order:

(a7) a silicon/silicon oxide layer obtainable by heating a $SiO_{1.00-1.80}$ layer in an oxygen-free atmosphere at a temperature above 400 °C,

(b7) a silicon/silicon oxide layer obtainable by heating a $SiO_{0.03-0.69}$ layer in an oxygen-free atmosphere at a temperature above 400 °C, and

(c7) a silicon/silicon oxide layer obtainable by heating a $SiO_{1.00-1.80}$ layer in an oxygen-free atmosphere at a temperature above 400 °C and optionally further layers.

9. A composition comprising a high molecular weight organic material and from 0.01 to 80 % by weight, preferably from 0.1 to 30 % by weight, based on the high molecular weight organic material, of a pigment according to any one of claims 2 to 8.

10. A cosmetic preparation or formulation comprising from 0.0001 to 90 % by weight of the plane-parallel structures of silicon/silicon oxide according to claims 1 or the pigment according to any one of claims 2 to 8 and from 10 to 99.9999 % of a cosmetically suitable carrier material, based on the total weight of the cosmetic preparation or formulation.

11. Use of a pigment according to any one of claims 2 to 8, in ink-jet printing, for dyeing textiles, for pigmenting surface coatings, printing inks, plastics, cosmetics, glazes for ceramics and glass.

12. A method of producing plane-parallel structures of silicon/silicon oxide, comprising the steps:

a) vapour-deposition of a separating agent onto a movable carrier to produce a separating agent layer,

b) vapour-deposition of an SiO_y layer onto the separating agent layer,

c) dissolution of the separating agent layer in a solvent,

d) separation of the SiO_y from the solvent, wherein $0.70 \leq y \leq 1.8$, and

e) heating the SiO_y in an oxygen-free atmosphere to a temperature above 400°C.